REMARKS

The Claim Objections/Minor Informalities Are Overcome.

Claim 9 is herein amended to properly depend from Claim 1 since Claim 6 has been canceled. Reconsideration of the objection with favorable action is respectfully requested.

The Double Patenting Rejection Is Overcome.

A Terminal Disclaimer is submitted herewith to obviate the obviousness-type double patenting rejection of Claims 30 and 33. Reconsideration of the rejection with favorable action is respectfully requested.

The Subject Matter of Claims 1, 3-5, 7-10, 14-19, 23-30 and 32-33 Is Not Anticipated By The '077 Patent to Canova.

In response to the rejection of independent Claims 1, 30 and 32-33 under 35 U.S.C. § 102(b) as being anticipated by Caldeira et al. (U.S. Patent No. 5,623,187), Applicants note that each of the rejected claims specify an electronic ballast with a lamp supply circuit for operating a discharge lamp, and "a programmable processor operable to vary an operating parameter of the lamp supply circuit to enable operation of a plurality of lamp types or sizes". Caldeira does not describe such a ballast. Caldiera describes a high frequency HID ballast with an arc instability controller for adjusting the operating frequency of the inverter to avoid acoustic resonance of the discharge arc. The arc instability controller and method described by Caldeira function to make the ballast insensitive to lamp dimensional variations caused by manufacturing imperfections, chemical modifications occurring during lamp life, and changes in lamp characteristics during its life. (See column 23, lines 26-33) The method involves experimentally operating a group of lamps of essentially the same type and size at a plurality of frequencies and at each frequency calculating lamp conductance. The conductance calculations show where strong resonances occur for that particular lamp. Once it is known where each of the strong resonances occur for the group of like lamps, a common window may then be selected in which each of the intended lamps can be operated by the

same lamp controller without the occurrence of strong resonances. (See column 12, lines 14-16)

In order to find a suitable operating window, each lamp within the group must be essentially the same type and size. This is evident from the description given by Caldeira where the permissible operating windows for several 100 W metal halide lamps, each made by a different manufacturer, were calculated in Figure 5c (where permissible operating windows are shown as solid lines A-E). (See also column 12, lines 16-19) In this exemplary use of the Caldeira arc instability controller, all lamps within the group A-E were of the same type (i.e., metal halide) and of the same size (i.e., 100 W).

Thus, the Caldeira arc instability controller merely operates to control visible flicker and strong resonances for lamps of the same type and size. Caldeira does not function to allow the ballast to operate lamps of different types or sizes. These two facts are evident from the following description found in the Caleira specification:

> If a ballast which could operate HID lamps over a broad range of rated Wattages (20-400 W, for example) were desired, detection of deviation in the conductance could be used to locate for any HID lamp an operating frequency which would be free of visible flicker induced by acoustic resonance. In practice, such a ballast is not commercially practical because voltage across and current through electronic devices determines cost; so each lamp is operated the most cost effectively by a ballast designed for than [sic] maximum power. (Column 11, lines 5-14)

Caldeira then further states:

> It is sufficient, and would be a great improvement over the art, if a high frequency ballast could operate lamps having arc tubes of similar shape (e.g., from different manufacturers) and a narrow range of wattages. A favorable embodiment of the invention is based on the pre-selection of a relatively narrow window of operating frequencies at which strong resonances (that causes deflection of the arc against the arc tube wall) do not occur for the intended range of lamps desired. After lamp ignition, the method and controller implementing this method operate within the pre-selected window to home-in on a frequency at which visible flicker caused by weak resonances does not occur for the specific lamp being controlled. (Column 11, lines 14-26)

In the above quoted passages, Caldeira teaches that it is impractical to design a ballast to

operate more than one lamp type or size and that it is "sufficient" and "a great improvement over the art" for the ballast to operate lamps with similarly shaped arc tubes made by different manufacturers (i.e., the same type of lamp) with a narrow range of wattages (i.e., the same size lamps whose actual wattages may vary slightly due to manufacturing imperfections, aging effects, and the like). Additionally, Caldeira confirms with these passages that the arc instability controller does not function to expand the operable range of lamp types or sizes that the ballast was designed to operate. It merely eliminates visible flicker and other arc deflections in lamps for which the ballast was designed to operate. This fact is further emphasized by the following description of the arc instability controller:

> The selection of components for the control C is based on the desired precision and sampling speeds necessary for effectively implementing the program of FIG. 9 and depends on lamp type, physical and chemical properties, lamp power and dimensions. (Column 21, line 64 to column 22, line 1)

Thus, even the arc instabillity controller is limited to the specific lamp type and size to be operated by the ballast in which the controller is implemented.

To further distinguish the claimed invention from Caldeira, independent Claims 1, 30 and 32-33 are herein amended to specify that the programmable processor is further operable to "oscillate the lamp supply circuit at 60 KHz or greater to avoid acoustic distortion and strobbing of the discharge lamp". Support for this amendment can be found at page 11, lines 6-7 and page 12, line 22 through page 13, line 4 of Applicant's specification. As set forth in Applicant's specification, oscillating the lamp supply circuit at the claimed frequencies eliminates acoustic distortion and strobbing that typically occur when discharge lamps are operated at lower frequencies. Caldeira teaches that it is necessary or desirable to equip ballast circuits with an arc instability controller to avoid destructive arc instabilities. In so doing, Caldeira necessarily teaches that the ballast should be operated at lower frequencies where arc instabilities occur. Otherwise, there would be no need for Caldeira's arc instability controller. For the group of 100 W metal halide lamps discussed in the Caldeira reference, Caldeira states that the permissible operating window is 20-25 KHz. (See column 12, lines 19-20) Caldeira further teaches that once an operating window free of strong

resonances is selected according to the described methodoly, ". . . the lamps should be operated only within this pre-selected window." (See column 12, lines 30-32)

Thus, Caldeira teaches an improvement to ballasts that operate at lower frequencies where arc instabilities occur. In contrast, the claimed invention is directed to an electronic ballast in which acoustic distortion and strobbing are minimal or nonexistent. Caldeira, therefore, is directed toward resolving a problem that the claimed invention does not suffer. Since the claimed invention avoids the problem that the Caldeira invention was made to address, Caldeira provides no motivation or teaching that is relevant to the claimed invention.

Since Caldiera's arc instability controller processor does not include "a programmable processor operable to vary an operating parameter of the lamp supply circuit to enable operation of a plurality of lamp types or sizes, said programmable processor being further operable to oscillate the lamp supply circuit at 60 KHz or greater to avoid acoustic distortion and strobbing of the discharge lamp" as specifically called for in independent Claims 1, 30 and 32-33, Caldiera cannnot anticipate these claims as a matter of law. Reconsideration and withdrawal of the rejection is therefore respectfully requested.

Independent Claims 18, 28 and 29 specify an electronic ballast with a lamp supply circuit for operating a discharge lamp, and "a programmable processor programmed to produce an oscillating processor signal for use in oscillating the supply circuit at a plurality of frequencies of 60 KHz or greater to enable the lamp supply circuit to operate discharge lamps of different types or sizes without acoustic distortion and strobbing". As discussed above, Caldeira's arc instability controller does not enable the ballast of which it is installed to operate lamps of different types or sizes. It merely enables the ballast to operate lamps of the same type and size without visible flicker and other arc deflections. Nor does Caldeira teach or suggest operating an electronic ballast at 60 KHz or greater. In fact, Caldeira actually teaches away from the high frequency operation set forth in Applicant's claims. To avoid duplication of all the above discussion, that discussion is hereby adopated and reasserted against the rejection of Claims 18, 28 and 29.

Claim 28 also specifies "an inductorless sustaining circuit for receiving the oscillating processor signal and producing an oscillating current signal for operating the discharge lamp after

ignition." Caldeira's lamp sustaining circuitry clearly includes an inductor. (See column 17, lines 56-59: "After the lamp starts, the impedance of the lamp is much lower than that of the capacitor C7, so the wave-shaping and current limiting is then controlled primarily by the LC network of C6 and L2.")

Since Caldeira does not teach or describe an electronic ballast with "a programmable processor programmed to produce an oscillating processor signal for use in oscillating the supply circuit at a plurality of frequencies of 60 KHz or greater to enable the lamp supply circuit to operate discharges lamps of different types of sizes without acoustic distortion or strobbing" as specifically called for in Claims 18, 28 and 29, nor "an inductorless sustaining circuit for receiving the oscillating processor signal and producing an oscillating current signal for operating the discharge lamp after ignition" as specifically called for in Claim 28, the invention of Claims 18, 28 and 29 is not anticipated by Caldeira as a matter of law. Reconsideration with favorable action is, therefore, respectfully requested.

Each of Claims 3-5, 7-10, 14-15, 19 and 23-27 further limit an allowable claim in ways that are neither taught or suggested by the prior art. Claims 3-5, 7-10, 14-15, 19 and 23-27 are therefore allowable and such action is respectfully requested.

The Subject Matter of Claims 29 and 31 Is Not Anticipated By The '661 Patent to Bogdan.

In response to the rejection of Claims 29 and 31 under 35 U.S.C. § 102(b) as being anticipated by Bogdan (U.S. Patent No. 6,040,661), Applicants note that each of these claims specify an electronic ballast with a lamp supply circuit for operating a "filamentless" discharge lamp. In contrast, Bogdan describes a ballast that is limited to operating lamps that have at least one filament, particularly fluorescent lamps. (See column 3, lines 16-19: "Thus, there is a need for a universal lighting ballast which is suited to operate a wide range of different fluorescent lamp types, and which can offer improved dimming and starting functionality on a cost effective basis." See also column 7, lines 47-49: "Resonance network 120 is configured as a typical series resonant circuit which ignites and controls a lamp 122 with filaments 124a and 125b")

In addition, each of the rejected claims specify "a programmable processor operable to vary

an operating parameter of the lamp supply circuit to enable operation of a plurality of lamp types or sizes". Bogdan does not describe such a ballast. Bogdan's fluorescent lamp ballast includes a processor that can be programmed by a host computer at the manufacturer to operate a particular type of fluorescent lamp. Note the following passage from Bogdan:

> Accordingly, when it is determined that a particular lamp is to be accommodated by universal ballast 110, application software is run on host computer 126 to determine what kind of program ballast 110 should be running. This program will be formatted to run on microprocessor 128 and will allow controller 125 to determine the proper set and sequence of frequencies and duty cycles which will result in proper lamp starting, running and dimming. Accordingly, the program will contain routines specific to these various functions and customized for the particular lamp at issue." (Column 8, lines 45-54)

Note also the following passage from Bogdan:

> When different lamps are inserted into the ballast, the starting conditions will of course change. In order to compensate for this, it will be necessary to program controller 125 to adjust the duty cycle and frequency of oscillating signal accordingly." (Column 10, lines 28-32)

Thus, when the ballast is programmed, the ballast is capable of operating a particular type or size of ballast. When a different lamp is to be operated by the ballast, the processor must be reprogrammed with a different program that is configured to operate the particular lamp that is to be installed.

From the above, it is clear that Bogdan does not teach or describe an electronic ballast for operating a filamentless discharge lamp. Nor does Bogdan teach or suggest an electronic ballast with a programmable processor that is programmed in a way that enables the ballast to operate lamps of different types and sizes. Accordingly, Bogdan does not anticipate the ballast specified in Claims 29 and 31 as a matter of law. Reconsideration and withdrawal of the rejection is, therefore, respectfully requested.

The Subject Matter of Claims 11-13 and 20-22 Is Not Suggested By The Combination of The '187 Patent to Caldeira and The '661 Patent to Bogdan.

Claims 11-13 and 20-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Caldeira in view of Bogdan on the ground that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the ballast of Caldeira to include a communication port as described by Bogdan, and thereby to arrive at Applicants' claimed invention. This rejection is respectfully traversed.

Applicants initially note that the patent to Caldeira does not teach or suggest an electronic ballast with a lamp supply circuit for operating a discharge lamp, and "a programmable processor operable to vary an operating parameter of the lamp supply circuit to enable operation of a plurality of lamp types or sizes, said programmable precessor being further operable to oscillate the lamp supply circuit at 60 KHz or greater to avoid acoustic distortion and strobbing of the discharge lamp" as specifically set forth in Claim 1 (from which Claims 11-13 depend). Nor does Caldeira teach or suggest an electronic ballast with a lamp supply circuit for operating a discharge lamp, and "a programmable processor programmed to produce an oscillating processor signal for use in oscillating the supply circuit at a plurality of frequencies of 60 KHz or greater to enable the lamp supply circuit to operate discharge lamps of different types or sizes without acoustic distortion and strobbing" as specifically set forth in Claim 18 (from which Claims 20-22 depend). Patentable distinctions between the invention of Claims 1 and 18 and the teachings of Caldeira are described in detail above. To avoid duplication, that discussion is hereby adopted and reasserted against the rejection under § 103(a).

Bogdan does nothing to cure the deficiencies of the Caldeira reference. Bogdan does not teach or suggest modification of the Caldeira ballast to include a programmable processor that enables the ballast to operate lamps of different types or sizes. Like Caldeira, the Bogdan ballast is capable of only operating a specific type of lamp. Therefore, the combination of Caldeira and Bogdan does not result in a ballast that can operate different lamp types or different sizes of lamps. Nor does the combination result in a ballast that can operate discharge lamps at frequencies where acoustic distortion and strobbing are minimal or nonexistent.

There is a further fatal flaw in the rejection in terms of the combinability of Caldeira and Bogdan. It is well established in the law governing questions of obviousness that there must be

something which suggests combining the teachings that would have motivated the person of ordinary skill to do so. Otherwise, the combination cannot have been obvious. Here, we have one reference, Caldeira, which describes a ballast for operating HID lamps, combined with another reference, Bogdan, which describes a ballast for operating fluorescent lamps. It is apparent that these two references rely on completely divergent approaches as they attempt to provide improvements to different performance characteristics of ballasts that operate fundamentally different types of lamps. The considerations involved in reducing the occurrence of arc resonances/deflections in HID lamps, which dictated the approach employed by Caldeira, are totally unlike the considerations involved in improving the starting, running and dimming of a fluorescent lamp, which dictated the approach employed by Bogdan. The two references teach ballast solutions and techniques that are incompatible and inapposite to one another.

For the above reasons, it is apparent that the subject matter of Claims 1 and 18 defines a patentable advance over the prior art and are therefore allowable. Claims 11-13 and 20-22 further limit an allowable claim in ways that are neither taught or suggested by the prior art and are therefore allowable as well. Reconsideration and withdrawal of the rejection, with favorable action, is respectfully requested.

Conclusion.

The Applicants have endeavored to address all of the Examiner's concerns expressed in the outstanding Office Action. Accordingly, amendments to the claims, the reasons therefore, and arguments in support of the patentability of the pending claim sets are presented above. Applicants believe that all of Claims 1-5 and 7-33 are now in condition for allowance and such action is respectfully requested.

In the event this response is not timely filed and an extension of time is not requested, Applicants hereby petition for an appropriate extension of time. The fee for this extension, along with any other fees which may be due with respect to this response, may be charged to our deposit account No. 50-1971.

If the Examiner identifies additional issues which can be resolved by telephone, the Examiner is invited to contact the undersigned at 918-595-4860.

Respectfully submitted,

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